

# UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 36508

CSAH NO. 6

OVER A

BRANCH OF THE CALDWELL CREEK

DISTRICT 1 - KOOCHICHING COUNTY

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION  
BY  
COLLINS ENGINEERS, INC.

JOB NO. 3512

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 36508, the East and West Abutments, were generally found to be in good, sound, and firm condition. However, the upstream pile of the West Abutment was split from the top of the pile to the channel bottom. The backwall and wingwall planking exhibited minor movement and displacement at the East Abutment, but no loss of fill was observed. The channel bottom around the substructure units appeared stable with no evidence of significant scour.

INSPECTION FINDINGS:

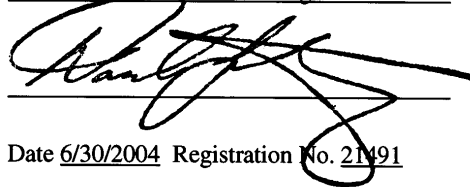
- (A) The upstream timber pile at the West Abutment exhibited cracking with decay in several locations extending through to the middle of the pile.
- (B) The backwall at the East Abutment exhibited 1/4-inch-wide gaps between the planks with minor movement of the planking detected, but with no loss of fill.
- (C) A 1/4-inch-wide split in the wall planking was observed 2 feet above the waterline, extending between the upstream pile of the East Abutment and the 5<sup>th</sup> pile in from the upstream fascia.
- (D) Overall, the timber piles were in good, sound and firm condition with occasional 1/8-inch-wide checking observed.

RECOMMENDATIONS:

- (A) Ideally, the cracked and decayed pile at West Abutment should be replaced to restore full load carrying capacity of the structure. If pile is not replaced or assisted with a helper pile, the existing pile should be monitored during future inspections.
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years. Note that the inspection can be accomplished with waders by general inspection personnel during a period of normal water levels.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

\_\_\_\_\_  
Daniel G. Stromberg

  
Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg  
Registered Professional  
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 36508

Feature Crossed: A Branch of the Caldwell Creek

Feature Carried: CSAH No. 6

Location: District 1 - Koochiching County

Bridge Description: The bridge superstructure consists of a timber deck and stringers supported by timber pile and planking end bents (abutments with wingwalls).

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg  
State of Minnesota, P.E., No. 21491

Dive Team: Michelle D. Koerbel, Matthew J. Lengyel

Date: August 24, 2002

Weather Conditions: Sunny,  $\pm 75^{\circ}$  F

Underwater Visibility: 1 to 2 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: East and West Abutments.

General Shape: The abutments and their skewed wingwalls are constructed of horizontal timber planking retained in place by a single row of piles along the abutment breastwall (with cap) and wingwalls.

Maximum Water Depth at Substructure Inspected: Approximately 1 foot

4. WATERLINE DATUM

Water Level Reference: The top of the pile cap at the upstream end of the East Abutment.

Water Surface: The waterline was approximately 6.5 feet below reference.  
Assumed Waterline Elevation = 93.5.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 6

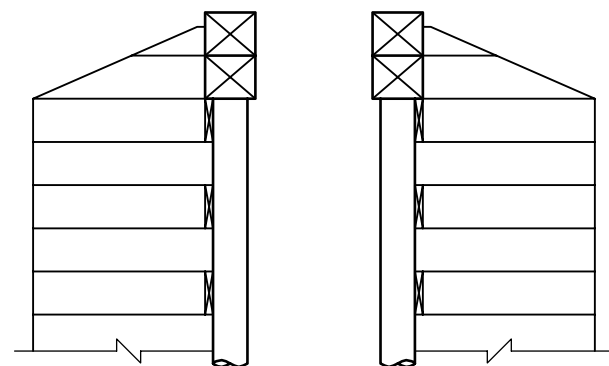
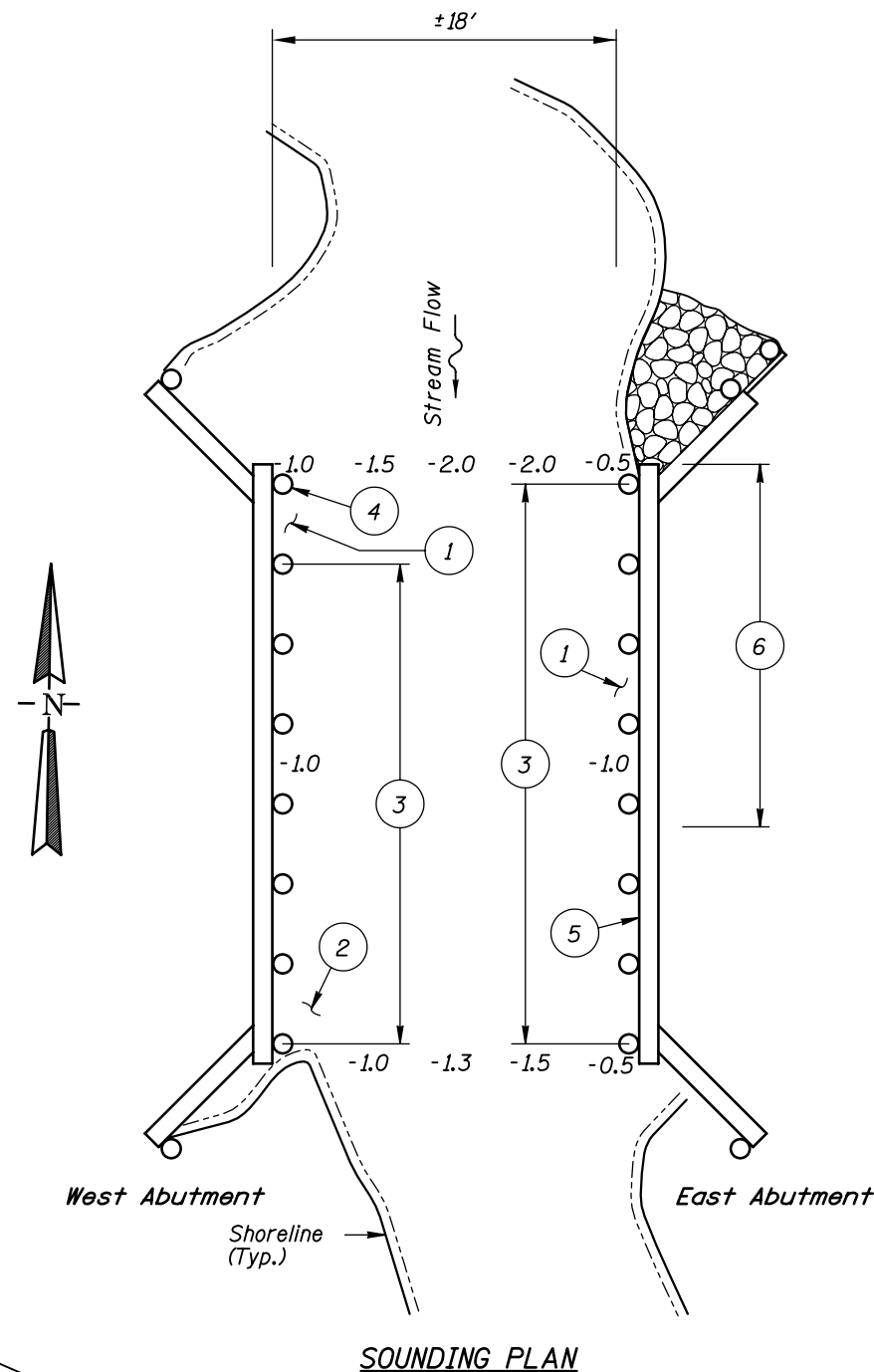
Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code A/08/02

Item 113: Scour Critical Bridges: Code J/02

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

\_\_\_\_\_ Yes      X   No



TYPICAL END VIEW OF ABUTMENTS

GENERAL NOTES:

1. The West and East Abutments were inspected underwater.
2. At the time of inspection on August 24, 2002, the waterline was located approximately 6.5 feet below the top of the pile cap at the upstream end of the East Abutment. Since design plans were not available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 93.5.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

- 1 The channel bottom consisted of 1-foot-diameter cobbles and riprap with no probe rod penetration.
- 2 The channel bottom consisted of silt and scattered riprap with up to 1 foot of probe rod penetration.
- 3 The timber piles were in good sound condition with occasional checking up to 1/8 inch wide.
- 4 The timber pile exhibited up to 1.5-inch-wide cracking with decay, in several locations, through to the middle of the pile.
- 5 The backwall exhibited 1/4-inch-wide gaps between the planks with minor planking movement detected, but no loss of fill.
- 6 A 1/4 inch wide split in the wall planking was observed 2 feet above the waterline and extended between the upstream pile of the East Abutment and the 5th pile in from the upstream fascia.

Legend

- 1.0 Sounding Depth from Waterline (8/24/02)
- Timber Pile
- Riprap

**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

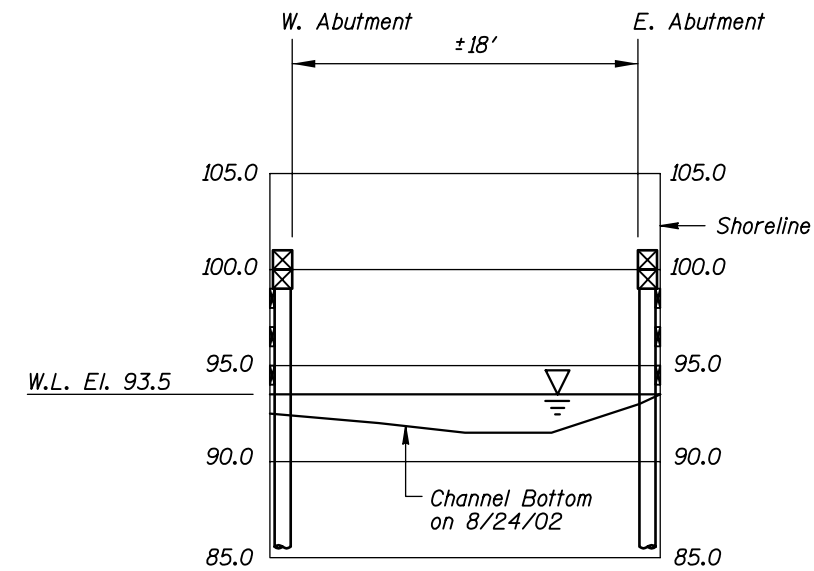
STRUCTURE NO. 36508  
OVER A STREAM  
DISTRICT 1, KOOCHICING COUNTY

**INSPECTION AND SOUNDING PLAN**

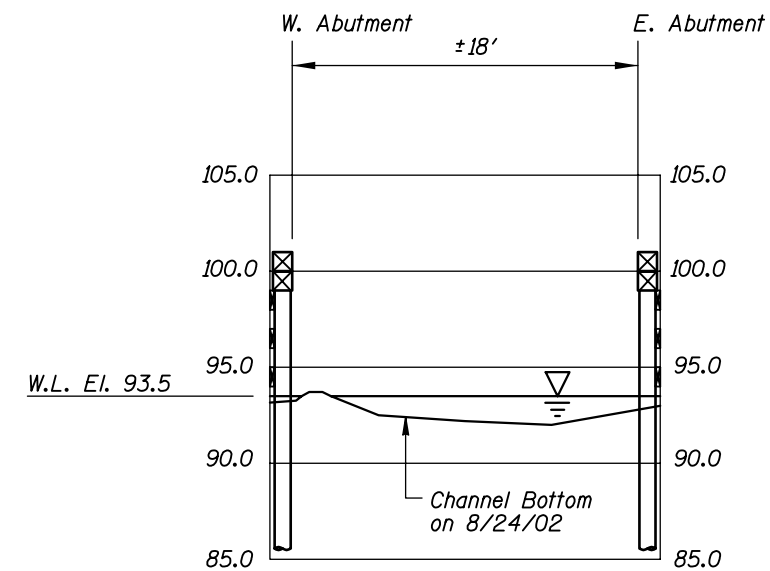
Drawn By: PRH  
Checked By: MDK  
Code: 351236508

**COLLINS ENGINEERS, INC.**  
300 W. WASHINGTON, STE. 600  
CHICAGO, ILLINOIS 60606  
(312) 704-9300

Date: AUG. 2002  
Scale: NTS  
Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 36508  
OVER A STREAM  
DISTRICT 1, KOOSKICHING COUNTY  
**UPSTREAM AND DOWNSTREAM  
FASCIA PROFILES**

Drawn By: PRH

Checked By: MDK

Code: 351236508



**COLLINS ENGINEERS, INC.**  
300 W. WASHINGTON, STE. 600  
CHICAGO, ILLINOIS 60606  
(312) 704-9300

Date: AUG. 2002

Scale: 1"=10'

Figure No.: 2





Photograph 1. Overall View of Structure, Looking Northeast.



Photograph 2. View of East Abutment, Looking Southeast.





Photograph 3. View of West Abutment, Looking Southwest.



Photograph 4. View of Split in the Upstream Pile of the West Abutment, Looking West.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES  
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc.

DATE: August 24, 2002

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.

BRIDGE NO: 36508

WEATHER: Sunny, " 75° F

WATERWAY CROSSED: A Branch of the Caldwell Creek

DIVING OPERATION:

SCUBA

SURFACE SUPPLIED AIR

X

OTHER Wading due to low water

PERSONNEL: Michelle D. Koerbel, Matthew J. Lengyel

EQUIPMENT: U/W Light, Scraper, Lead Line, Probe Rod, Camera

TIME IN WATER: 12:20 P.M.

TIME OUT OF WATER: 12:45 P.M.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 1 to 2 feet

DEPTH 1 foot maximum at East Abutment

ELEMENTS INSPECTED: East and West Abutments

REMARKS: Overall, the timber piles, timber backwall, and wingwall planking at both abutments was in good and sound condition, except for the upstream most pile of the West Abutment, which was split the full height of the pile with some decay present. The backwall and wingwall planking was stable with no loss of fill, although the East Abutment wall showed some existence of minor plank movement with up to 1/4 inch wide gaps. The East Abutment wall also had some 1/4 inch wide horizontal splitting through one plank.

FURTHER ACTION NEEDED:   X   YES            NO

Ideally, the cracked and decayed pile at West Abutment should be replaced to restore full load carrying capacity of the structure. If pile is not replaced or assisted with a helper pile, the existing pile should be monitored during future inspections

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years. Note that inspection can be accomplished with waders by general inspection personnel during a period of normal water levels.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 36508  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., No. 21491  
WATERWAY CROSSED A Branch of the Caldwell Creek

INSPECTION DATE August 24, 2002  
NOTE: USE ALL APPLICABLE CONDITION  
DEFINITIONS AS DEFINED IN THE MINNESOTA  
RECORDING AND CODING GUIDE INCLUDING  
GENERAL, SUBSTRUCTURE, CHANNEL AND  
PROTECTION, AND CULVERTS AND WALL  
DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (WALL PLANKING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	East Abutment	+1.0'	7	N	N	7	6	7	8	8	7	8	7	N	N	7	7	N	N
	West Abutment	+1.0'	5	N	N	9	7	6	8	8	7	8	7	N	N	6	6	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the timber piles, timber backwall, and wingwall planking at both abutments was in good and sound condition, except for the upstream most pile of the West Abutment, which was split the full height of the pile with some decay present. The backwall and wingwall planking was stable with no loss of fill, although the East Abutment wall showed some existence of minor plank movement with up to 1/4 inch wide gaps. The East Abutment wall also had some 1/4 inch wide horizontal splitting through one plank.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.  
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.